PROGRAM SUCCESS PROBABILITY

John Higbee
DAU
2 June 2004

STARTING POINT

- **Tasking From ASA(ALT) Claude Bolton (March 2002)**
  - **Despite Using All the Metrics Commonly Employed to Measure Cost, Schedule, Performance and Program Risk, There are Still Too Many Surprises (Poorly Performing /Failing Programs) Being Briefed "Real Time" to Army Senior Leadership**
- **DAU (with Industry Representatives) was Asked to:**
  - **Identify a <u>Comprehensive Method</u> to Better Determine the Probability of Program Success**
  - **Recommend a <u>Concise "Program Success" Briefing Format</u> for Use by Army Leadership**

PROCESS PREMISE

- **Classical <u>Internal Factors</u> for Cost, Schedule, Performance and Risk (Largely <u>Within the Control</u> of the Program Manager) Provide an Important Part of Program Success Picture – But NOT the WHOLE Picture**
  - Program Success also Depends on <u>External Factors</u> (Largely <u>Not</u> Within the PM's Control, but That the PM <u>Can Influence</u> By Informing/Using Service/OSD Senior Leadership)

- **Accurate Assessment of Program Success Probability Requires a Holistic Combination of Internal and External Factors**
  - Internal: <u>Requirements</u>, <u>Resources</u>, and <u>Execution</u>
  - External: <u>Fit in the Vision</u>, and <u>Advocacy</u>

- **Next Step - Develop An Assessment Model/Process Using Selected Metrics For Each Factor - Providing an Accurate "Program Pulse Check"**
  - "Five Factors" are Consistent Across All Programs/All Acq. Cycle Phases
  - Metrics for Each Factor are Tailorable by PM/PEO to Specific Program Situation (Program Type/Phase of Acq. Process)
    - "Don't Force Everyone into a Size 4 AAA Shoe…"

BRIEFING PREMISE

- **<u>Significant Challenge</u> – Develop a Briefing Format That**
  - **Conveys Program Assessment Process Results Concisely/Effectively**
  - **Is Consistent Across Army Acquisition**

- **<u>Selected Briefing Format</u>:**
  - **Uses A Summary Display**
    - **Organized Like a Work Breakdown Structure**
      - **Program Success (Level 0); Factors (Level 1); Metrics (Level 2)**
  - **Relies On Information Keyed With Colors And Symbols, Rather Than Dense Word/Number Slides**
    - **Easier To Absorb**
  - **Minimizes Number of Slides**
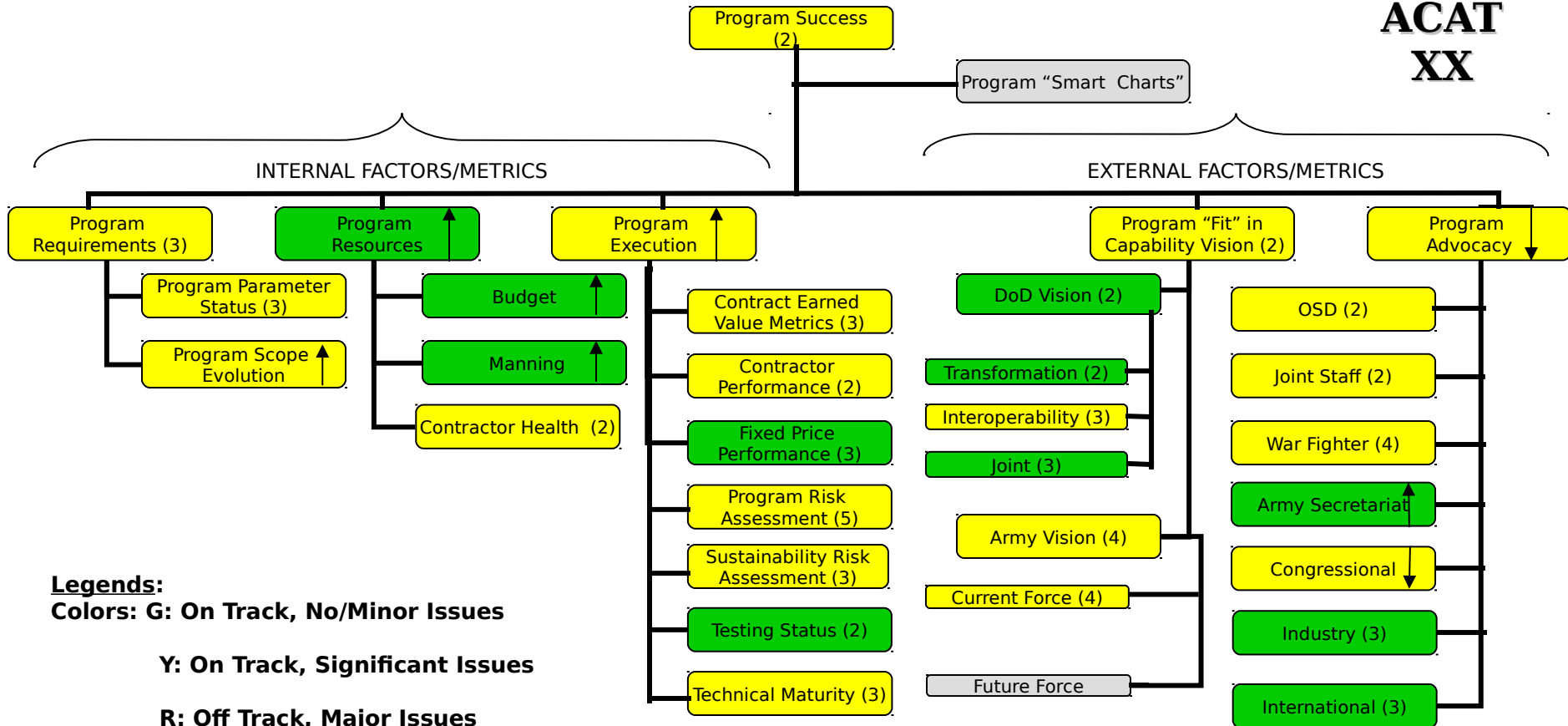   - **More Efficient Use Of Leadership's Time – Don't "Bury in Data"!**

PROGRAM SUCCESS PROBABILITY SUMMARY

COL, PM

Date of Review: dd mmm yy

Program Acronym ACAT XX

Program Success (2)

Program "Smart Charts"

INTERNAL FACTORS/METRICS

EXTERNAL FACTORS/METRICS

Internal Factors:

- Program Requirements (3)
  - Program Parameter Status (3)
  - Program Scope Evolution
- Program Resources
  - Budget
  - Manning
  - Contractor Health (2)
- Program Execution
  - Contract Earned Value Metrics (3)
  - Contractor Performance (2)
  - Fixed Price Performance (3)
  - Program Risk Assessment (5)
  - Sustainability Risk Assessment (3)
  - Testing Status (2)
  - Technical Maturity (3)

External Factors:

- Program "Fit" in Capability Vision (2)
  - DoD Vision (2)
  - Transformation (2)
  - Interoperability (3)
  - Joint (3)
  - Army Vision (4)
  - Current Force (4)
  - Future Force
- Program Advocacy
  - OSD (2)
  - Joint Staff (2)
  - War Fighter (4)
  - Army Secretariat
  - Congressional
  - Industry (3)
  - International (3)

Legends:
Colors: G: On Track, No/Minor Issues

Y: On Track, Significant Issues

R: Off Track, Major Issues
Gray: Not Rated/Not Applicable
Trends: Up Arrow: Situation Improving
**   (number):   Situation Stable**
**   (for # Reporting Periods)**
**   Down Arrow: Situation Deteriorating**

Program Life Cycle Phase: _____

REQUIREMENTS - PROGRAM PARAMETER STATUS

COL, PM   **Date of Review: dd mmm yy**

(EXAMPLES)

Threshold   Objective

Combat Capability

Position diamond along bar to best show where each item is in terms of its threshold - objective range.

C4I Interoperability
   (Strategic, Theater, Force
      Coord.,Force Control, Fire
Cost   Control)

Manning (Non-KPP)

◇ -Status as of Last Br
   (mm/yy – e.g. "01/03

Sustained Speed

Endurance

Comments:

Historical

Y(3)

Predictive

Y

6

REQUIREMENTS - PROGRAM SCOPE EVOLUTION

COL, PM   **Date of Review: dd mmm yy**

	Requirement (CE to FUE)	**Funded Pgm** (Budgeted/Obl)	**Schedule** (Used / Planned)
• **Original**	ORD (date)	$#.#B / NA	NA / 120 Months
• **Current**	ORD (date)	$#.#B / $#.#B	170/210 Months

Comments: **Stable**
Increased
Descoped

Historical

Y ↑

Predictive

Y

RESOURCES - BUDGET

COL, PM   Date of Review: dd mmm yy

Army Goals (Obl/Exp):	First Year	Second Year	Third Year
RDT&E,A	95%/58%	100%/91%	-------
OP,A	70%/--	85%/--	100%/---
OM,A			-------

SUFF R/Y/G	FY01	OBL /EXP	FY02	OBL /EXP	FY03	OBL/ EXP	FY04	FY05	FY06	FY07	FY08	FY09
RDT&E, A		Xx %/y y%		Xx %/y y%		Xx %/yy %						
OPA	N/A	Xx %/y y%	N/A	Xx %/y y%	N/A	Xx %/yy %	N/A	N/A	N/A			
APA	N/A	Xx %/y y%	N/A	Xx %/y y%	N/A	Xx %/yy %	N/A	N/A	N/A	N/A	N/A	N/A
WPA	N/A	Xx %/y y%	N/A	Xx %/y y%	N/A	Xx %/yy %	N/A	N/A	N/A	N/A		
O&M,A	N/A	Xx %/y y%	N/A	Xx %/y y%		Xx %/yy %						
MILCO	N/A	Xx %/y y%	N/A	Xx %/y y%	N/A	Xx %/yy %	N/A	N/A	N/A	N/A	N/A	N/A

Comments:

Historical

(G↑)

Predictive

(G)

8

RESOURCES - MANNING

Progra m Acrony m ACAT XX

COL, PM   **Date of Review: dd mmm yy**
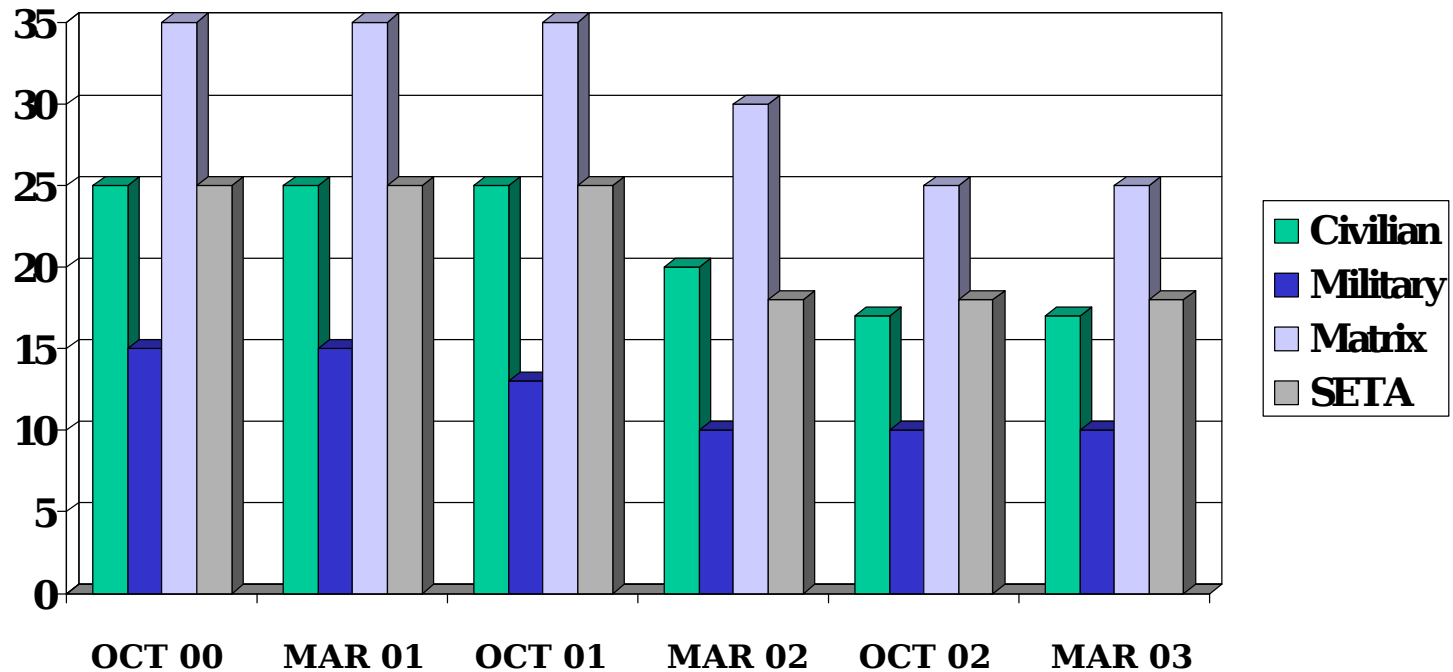
Comments:

What Key Billets are Vacant?
- **DPM Billet Still Vacant (Estimate Fill in Two Months)**
- **Lead Software Engineer (Emergent Loss) – Tech Director Filling In**
  - **Need S/W Experienced GS-14 ASAP**

Is the Program Office Adequately Staffed? Yes (except as noted above)

Historical

G↑

Predictive

G

9

- **Corporate Indicators**
  - **Company/Group Metrics**
    - **Current Stock P/E Ratio**
    - **Last Stock Dividends Declared/Passed**
    - **Industrial Base Status (Only Player? One of __ Viable Competitors?)**
      - **Market Share in Program Area, and Trend (over last Five Years)**
    - **Significant Events (Mergers/Acquisitions/ "Distractors")**
- **Program Indicators**
  - **Program-Specific Metrics**
    - **"Program Fit" in Company/Group**
    - **Program ROI (if available)**
    - **Key Players, Phone Numbers, and their Experience**
    - **Program Manning/Issues**
    - **Contractor Facilities/Issues**
    - **Key Skills Certification Status (e.g. ISO 9000/CMM Level)**
- **PM Evaluation of Contractor Commitment to Program**
  - **High, Med, or Low**

Historical

Predictive

Y(2)

Y

EXECUTION – CONTRACT EARNED VALUE METRICS [give short contract title]

COL, PM **Date of Review: dd mmm yy**

Axxxxx-YY-Cxxxx   **Contractor Name [Prime or Significant Sub]**

[TCPI$_{BAC}$ = 0.76]

CV = $2.0 M

SV = -$2.9 M

Total Calendar Sched

04/00   01/02   04/02   04/04   08/04

0 %   42%   50%   100% 108% 122%   111%   100%   56%   0%

PM's EAC

CPI

1.18
1.14
1.10
1.06
1.02
0.98
0.94
0.90
0.86
0.82

Behind Schedule and Underspent

Ahead of Schedule and Underspent

(-0.95, 1.1)

04/99
07/99
10/99
04/00
01/00
07/00 10/00
1/01
02/02 04/01
03/02 07/01
05/02
04/02
0.960
(-0.95, -0.95)
01/02 10/01
0.940

(1.1,1.1)

(1.1, -0.95)

PM's Projected Performance at Completion for CPI and Duration.

Behind Schedule and Overspent   **Ahead of Schedule and Overspent**

0.82   0.86   0.90   0.94   0.98   1.02   1.06   1.10   1.14   1.18

SPI

$110 $100 $90 $50

EAC
TAB
BAC
ACWP

EV % Spent   **Total Spent**

$M
EAC

0

KTR's EAC: 104M

YYMMD

Historical   Predictive

Date of Last Award Fee: MMM YY

Date of Last Rebaselining: JAN02 **D**
Number of Rebaselinings: 1

11

Y (3)   **Y**

Contractor:	((Contractor Name))						Contract Start Date:			MMM YY			
Program:	((Program Name))						Estimated Completion Date:			MMM YY			
Contract Number:	N00000-00-C-0000												

Item: (CPAR, IPAR or AF)	AF	CPAR	AF	AF	IPAR	CPAR	IPAR	AF	IPAR	IPAR	AF	IPAR	CPAR	IPAR
Period Ending: (Mmm YY)	Jan 99	Apr 99	Jul 99	Jan 00	Mar 00	Apr 00	Jun 00	Jul 00	Sep 00	Dec 00	Jan 01	Mar 01	Apr 01	Jun 01
Months Covered: (NR)	6	12	6	6	3	12	3	6	3	3	6	3	12	3
Areas to Evaluate														
a. Technical (Quality of Product)		EXC			EXC	EXC	EXC							
(1) Product Performance		VG			VG	VG	VG							
(2) Systems Engineering		SAT			SAT	SAT	SAT							
(3) Software Engineering		MARG			MARG	MARG	MARG							
(4) Logistics Support/Sustainment		UNSAT			UNSAT	UNSAT	UNSAT							
(5) Product Assurance		EXC			EXC	EXC	EXC							
(6) Other Technical Performance		VG			VG	VG	VG							
b. Schedule		SAT			SAT	SAT	SAT							
c. Cost Control		MARG			MARG	MARG	MARG							
d. Management		UNSAT			UNSAT	UNSAT	UNSAT							
(1) Management Responsiveness		EXC			EXC	EXC	EXC							
(2) SubContract Management		VG			VG	VG	VG							
(3) Program Mgmt and Other Mgmt		SAT			SAT	SAT	SAT							
e. Other Areas		MARG			MARG	MARG	MARG							
(1) Communications		UNSAT			UNSAT	UNSAT	UNSAT							
(2) Support to Government Tests		UNSAT			UNSAT	UNSAT	UNSAT							
Award Fee Percentage:	85%		70%	90%				84%						

Historical

Y(2)

12

Predictive

Y

- **DCMA Plant Rep Evaluation**
  - **Major Issues**
- **Delivery Profile Graphic (Plan vs Actual)**
  - **Major Issues**
- **Progress Payment Status**
  - **Major Issues**

Historical

G **(3)**

Predictive

G

13

•A brief description of Issue # 1 and rationale for its rating.

•Approach to remedy/mitigation

•A brief description of Issue # 5 and rationale for its rating.
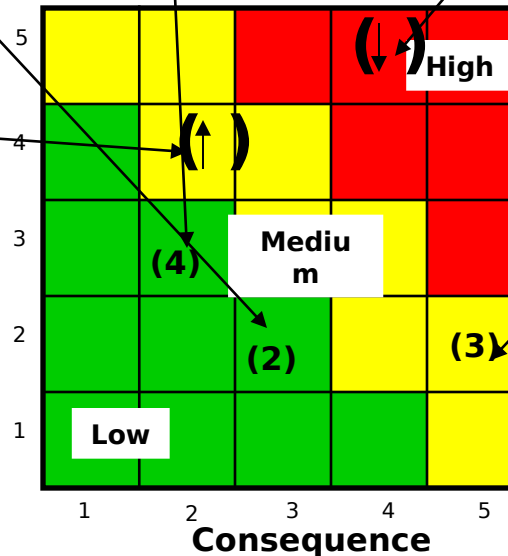
•Approach to remedy/mitigation

•A brief description of Issue # 2 and rationale for its rating.

•Approach to remedy/mitigation

•A brief description of Issue # 3 and rationale for its rating.

•Approach to remedy/mitigation

•A brief description of Issue # 6 and rationale for its rating.

•Approach to remedy/mitigation

Likelihood

5

4

3

2

1

(↓) High

(↑)

(4)

Medium

(2)

(3)

Low

1   2   3   4   5

Consequence

Trends: Up Arrow: Situation Improving
        (#):   Situation Stable
                      (for # Reporting Periods)
        Down Arrow: Situation Deteriorating

Historical

Y (5)

Predictive

Y

14

EXECUTION – SUSTAINABILITY RISK ASSESSMENT

COL, PM   **Date of Review: dd mmm yy**

■ Low Risk   ■ Medium Risk   ■ High Risk

Likelihood

Consequence
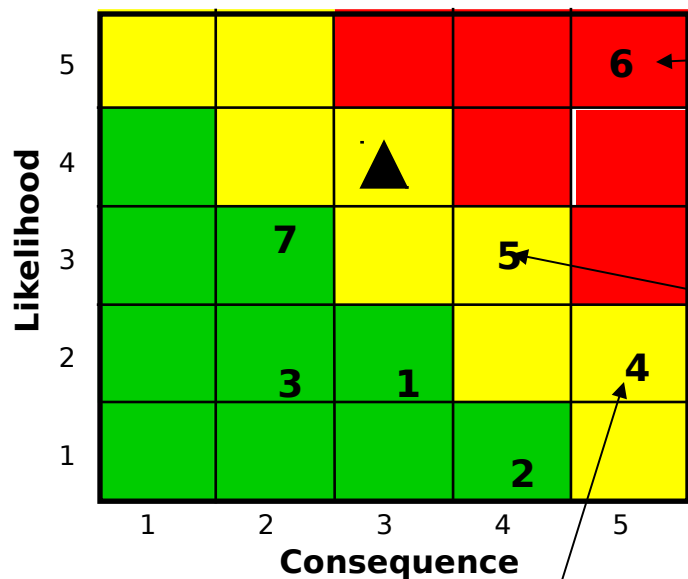
RISK # 6

Brief description of Issue and rationale for its rating.

Approach to remedy/mitigation.

RISK #5
Brief description of Issue and rationale for its rating.

Approach to remedy/mitigation.

RISK # 4
Brief description of Issue and rationale for its rating.

Approach to remedy/mitigation.

Sustainability Areas *(examples)*

▲   **: Overall Assessment**
1: Training
2: Support Equipment
3: Publications
4: Facilities
5: Maintenance Concept
6: Supply Support
7: MTBF/Ao/Reliability

Historical

Y(3)

15

Predictive

Y

- **Contractor Testing (e.g. Qualification, Integration) - Status (R/Y/G)**
  - **Major Points/Issues**
- **Developmental Testing – Status (R/Y/G)**
  - **Major Points/Issues**
- **Operational Testing – Status (R/Y/G)**
  - **Major Points/Issues**
- **Follow-On Operational Testing – Status (R/Y/G)**
  - **Major Points/Issues**
- **Special Testing – Status (R/Y/G) (Could Include LFT&E, Interoperability Testing (JITC), Etc.)**
  - **Major Points/Issues**
- **TEMP Status**
- **Other (DOT&E Annual Report to Congress, etc – As Necessary)**

Historical   Predictive
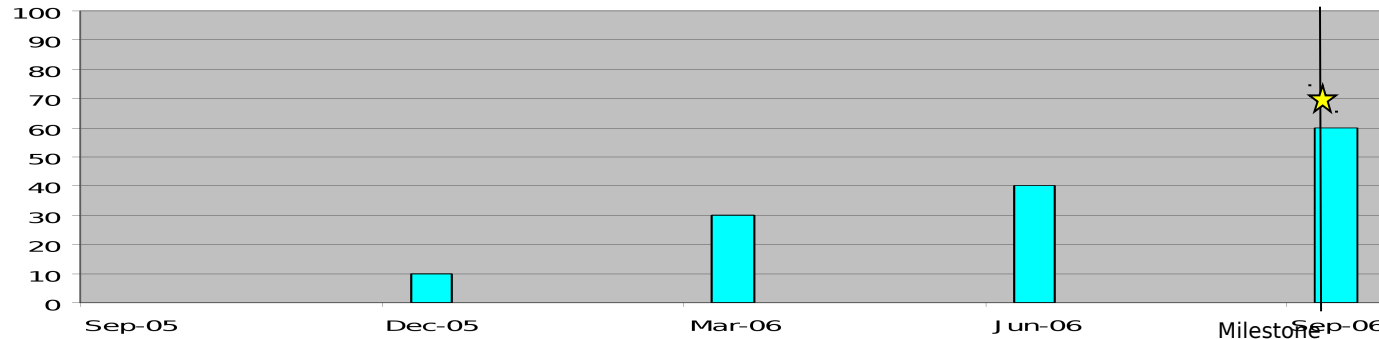
G(2)

16

G

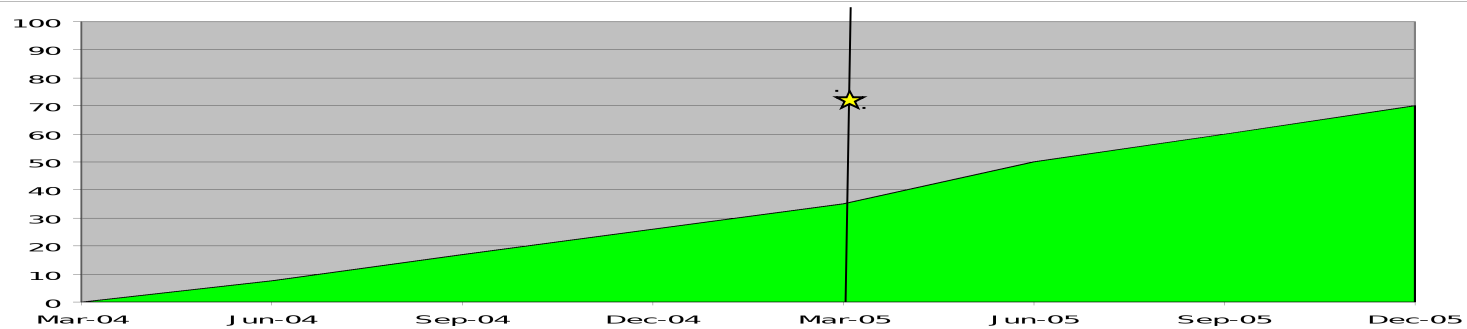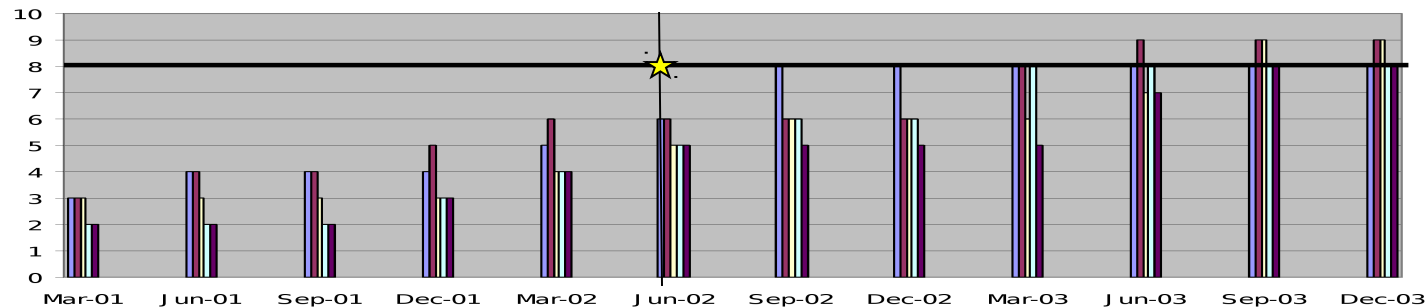**Percentage of Production Processes Under SPC**

Percentage of Engineering Drawings Approved/Released

Maturity of Key Technologies

Historical

Predictive

Y(3)

Y

PROGRAM "FIT" IN CAPABILITY VISION

COL, PM   **Date of Review: dd mmm yy**

AREA(Examples)	STATUS	TREND
DoD Vision	**G**	**(2)**
• **Transformation**	**G**	**(2)**
• **Interoperability**	**Y**	**(3)**
• **Joint**	**G**	**(3)**
Army Vision	**Y**	**(4)**
• **Current Force**	**Y**	**(4)**
• **Future Force (N/A)**	**(N/A)**	
• **Other**	**(N/A)**	**(N/A)**
• **Overall**	**Y**	**(2)**

Historical

Y (2)

Predictive

Y

PROGRAM ADVOCACY

COL, PM   **Date of Review: dd mmm yy**

AREA(Examples)	STATUS		TREND	
• **OSD**	Y	(2)		
– **(Major point)**				
• **Joint Staff**	Y	(2)		
– **(Major point)**				
• **War Fighter**	Y	(4)		
– **(Major point)**				
• **Army Secretariat**	G			↑
– **(Major point)**				
• **Congressional**			Y	↓
– **(Major point)**				
• **Industry**	G	(3)		
– **(Major Point)**				
• **International**	G	(3)		
– **(Major Point)**				
• **Overall**	Y			↓

Historical

Predictive

Y↓

19

Y

```
                          ┌─────────────────┐
                          │ Program Success │
                          │       (2)       │
                          └─────────────────┘
┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────────┐  ┌──────────────┐
│   Program    │  │   Program    │  │   Program    │  │  Program Fit in  │  │   Program    │
│Requirements(3)│ │ Resources  ↑ │  │ Execution  ↑ │  │Capability Vision(2)│ │ Advocacy   ↓ │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────────┘  └──────────────┘
```
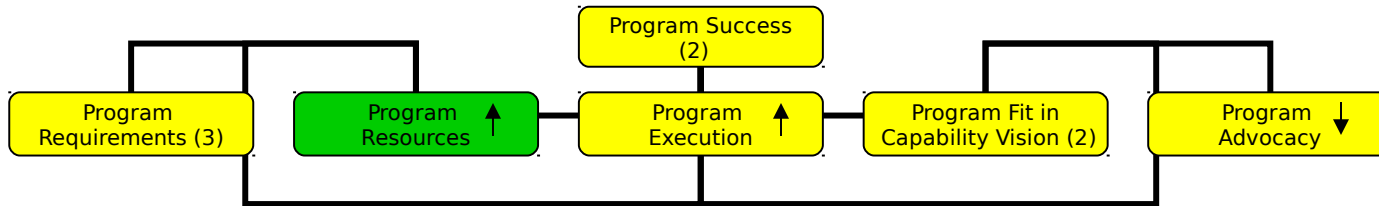
- Comments/Recap – PM's "Closer Slide"

STATUS/FUTURE PLANS

- **Status**
  - **Multiple Acquisition Staffs (Navy, Air Force, USD(AT&L), NSA, MDA and Space Acq Executive) Have Requested the Product and are Reviewing /Considering It for Use**
  - **Multiple DoD and Industry Program Managers (including F/A-22, THAAD, In Service CVN) have Adopted It as an Assessment/ Reporting Tool**
  - **Some Int'l Interest (UK Nat'l Audit Office; Australian DMO)**
- **OCT 2002 – ASA(ALT) Briefed on Effort; Expressed Intent to Implement Program Success Factors Across Army**
- **DEC 2002 – Program Success Factors Pilot Commences in Two Army Programs in PEO (IEW&S)**
- **JULY 2003 – Army Decides to Phase-Implement Program Success Factors Across Army Acquisition; ALTESS Begins Automation Effort on Army AIM System**
- **DEC 2003 – ASA(ALT) Signs Out PSF Implementation Memo**
- **JAN 2004 – PSF Application Goes "Live" on AIM**
- **MAR 2004 – First Four Programs (BLACKHAWK, COMANCHE, WIN-T and FBCB2) Submit PSF Reports**

BACKUP SLIDES

QUANTIFICATION PROCESS

- **First Three Factors (<u>Requirements</u>, <u>Resources</u>, and <u>Execution</u>) Represent *<u>How the Program is Operating</u>***
  - **Nominally 60% in Aggregate**
- **Last Two Factors (<u>Fit in Strategic Vision</u> and <u>Advocacy</u>) Represent *<u>Whether or Not the Program Should/Could be Pursued</u>***
  - **Nominally 40% in Aggregate**
- **First Three Factors (in Aggregate) Have "Greater Effect" on Program Success than Last Two Factors, but NOT a "Much Greater Effect"**

PROBABILITY OF PROGRAM SUCCESS "BANDS"

- **Green (80 to 100)**
  - **Program is On Track for Providing Originally-Scoped Warfighting Capability**
    - **Within Budgeted Cost and Approved Schedule**
    - **Issues are Minor in Nature**
- **Yellow (60 to <80)**
  - **Program is On Track for Providing Acceptable Warfighting Capability**
    - **With Acceptable Deviations from Budgeted Cost and Approved Schedule**
    - **Issues May Be Major but are Solvable within Normal Acquisition Processes**
- **Red (< 60, or Existing "Killer Blows" in Level 2 Metrics)**
  - **Program is OFF Track**
    - **Acceptable Warfighting Capability**
      - **will NOT be Provided, or**
      - **Will ONLY be Provided with Unacceptable Deviations from Budgeted Cost and Approved Schedule**
    - **Issues are Major and NOT Solvable within Normal Acquisition Processes (e.g. Program Restructure Required)**

"KILLER BLOW"

- **"Killer Blow" at the Sub-Factor (Level II) Level**
  - **Action Taken By A Decision Maker In The Chain Of Command (Or An "Advocacy" Player) Resulting In Program Non-Executability Until Remedied**
    - **For Example: Zeroing Of Program Budget By Congressional Committee/Conference**
  - **Results In Immediate "Red" Coloration Of Associated Level 2, Level 1 And Overall PS Metrics Until Remedied**

PEO XXX

EXECUTION – TECHNICAL MATURITY

COL, PM

Date of Review: dd mmm yy

Program Acronym

ACAT XX

- **CRITICAL TECHNOLOGY MATURITY**

  CRITICAL TECHNOLOGY   **DESCRIPTION/ISSUE**   **TRL**   **G/Y/R**

- **PROGRAM DESIGN MATURITY**

  - **ENGINEERING DRAWINGS**   **G/Y/R**
    - **PERCENTAGE OF DRAWINGS APPROVED /RELEASED FOR USE**
    - **ISSUES**

  - **PROGRAM INTEGRATION/PRODUCTION FACTORS**
    - **INTREGRATION/PRODUCTION FACTOR**   **DESCRIPTION/ISSUE**   **IRL/PRL**   **G/Y/R**

- **PROGRAM PRODUCTION MATURITY**

  - **KEY PRODUCTION PROCESSES**   **G/Y/R**
    - **PERCENTAGE OF KEY PROD. PROC. UNDER STAT. PROCESS CONTROL**
    - **ISSUES**

Historical

G(2)

Predictive

G

- **Contractor Performance Assessment (Drawn From CPARS/PPIMS, etc)**
  - **Last Evaluation**
    - **(Provide Summary of Evaluation Last Provided to Contractor, Along with PM evaluation of Current Status)**
      - **Highlight Successes as Well as Areas of Concern**
  - **Performance Trend (over the Contract Period of Performance)**
    - **Highlight Successes as Well as Areas of Concern**

- **Award/Incentive Fee History**
  - **Summary of Actual Award/Incentive Fees Provided to Contractor**
    - **If Different than Specified in Fee Plan, Discuss Reasons/Actions Indicated from the Situation**
    - **Are Fee Awards Consistent with Contractor Performance Assessments?**

Historical

G(2)

Predictive

G

27